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EP 0257686 A1

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(54) Aryloxy benzotriazole herbicidal compositions

(57) A herbicidal composition comprises an active compound as defined in EP-A-355049 or EP-A-367242 in combination with an adjuvant selected from silicon polymers, oil based spray adjuvants, alcohol ethoxylates, nonyl phenol ethoxylates, amine ethoxylates, blended surfactants, alkoxylated amines, alkyl glucosides, sulphated oils, urea ammonium nitrate, Azone and DASH. The adjuvant allows the rate of herbicide to be reduced significantly without losing the benefit of the overall control.

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HERBICIDAL COMPOSITIONS

The present invention relates to herbicidal compositions comprising an aryloxy benztriazole herbicide in combination with adjuvants.

EP-A-355049 and EP-A-367242 disclose aryloxy benztriazole derivatives which have herbicidal activity. EP-A-355049 also describes how these compounds may be used with certain adjuvants. The subject matter of these applications is incorporated by reference.

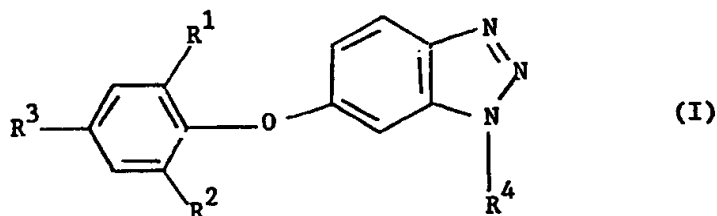
The applicants have found that unexpectedly good results may be obtained by mixing compounds of EP-A-355049 or EP-A-367242 with certain types of adjuvants in particular.

According to the present invention there is provided a herbicidal composition comprising a compound as defined in EP-A-355049 or EP-A-367242 in combination with an adjuvant.

Particularly suitable adjuvants for use in the compositions of the invention are those selected from the following groups:

- A. Silicon polymers such as Silwet L77, Q2 5152, X2 5309, Abil ZP2434;
 - B. Oil based spray adjuvants such as Atplus 411F, Atplus 412, Canplus 328, Spraymate, Orchex 796;
 - C. Alcohol ethoxylates such as Atlox 4848, Synperonic A7, Synperonic 91/6, Synperonic A20;
 - D. Nonyl phenol ethoxylates such as Agral 90;
 - E. Amine ethoxylates such as Synprolam 35x10 and Ethoquad C15;
 - F. Blended surfactants such as Atplus 300F;
 - G. Alkoxylated amines such as Acer 89001 and Acer 89002;
 - H. Miscellaneous adjuvants such as alkyl glucosides and sulphated oils such as calsolene oil HS; urea ammonium nitrate; Azone and DASH.
- Preferred adjuvants are Silvett L77, X25309, Atplus 411F, Atlox 4848, Synperonic A7 and DASH.

Preferred aryloxy benztriazole derivatives for use in the compositions are those of formula (I):



where R^1 and R^2 are selected from hydrogen or halogen;
 R^3 is haloalkyl such as trifluoromethyl and

R^4 is a group $\begin{array}{c} R^5 \\ | \\ -C- \\ | \\ R^6 \end{array} - R^7 R^8$

where R^5 and R^6 are hydrogen or lower alkyl, R^7 is $(CH_2)_n$ where n is 0, 1 or 2 and R^8 is a carboxylic acid or ester group such as CO_2R^9 where R^9 is hydrogen or lower alkyl.

Preferably n is 0.

Examples of halogen groups for R^1 and R^2 are chlorine and fluorine.

As used herein, the term 'lower' alkyl includes C_{1-6} alkyl in particular C_{1-3} alkyl.

Examples of R^9 are methyl and ethyl.

Other preferred groups of aryloxybenztriazole herbicides are set out in EP-A-355049 and EP-A-367242.

It has been found that by employing the compositions of the invention, the rates of the herbicide required, can be reduced significantly without losing the benefit of the overall control.

The compositions of the invention are active as herbicidally and therefore, in a further aspect the invention provides a process for severely damaging or killing unwanted plants which process comprises applying to the plants, or to the growth medium of the plants, a herbicidally effective amount of a composition comprising an aryloxy benztriazole herbicide as hereinbefore defined and an adjuvant as hereinbefore defined.

The compositions are active against a broad range of weed species including monocotyledonous and dicotyledonous species. They are therefore useful for broad spectrum weed control in TVC (total vegetation control) situations. The composition of the invention may be applied directly to the plant (post-emergence application) or to the soil before the emergence of the plant (pre-emergence application). They are particularly useful when applied post-emergence.

The compositions of the invention may be used on their own to inhibit the growth of, severely damage, or kill plants but are preferably used with the form which further comprises a carrier comprising a solid or liquid diluent.

Compositions of the invention include both dilute compositions, which

are ready for immediate use, and concentrated compositions, which require to be diluted before use, usually with water. Preferably the compositions contain from 0.01% to 90% by weight of the active ingredient. Dilute compositions ready for use preferably contain from 0.01% to 2% of active ingredient, while concentrated compositions may contain from 20% to 90% of active ingredient, although from 20% to 70% is usually preferred.

The solid compositions may be in the form of granules, or dusting powders wherein the active ingredient is mixed with a finely divided solid diluent, e.g. kaolin, bentonite, kieselguhr, dolomite, calcium carbonate, talc, powdered magnesia, Fuller's earth and gypsum. They may also be in the form of dispersible powders or grains, comprising a wetting agent to facilitate the dispersion of the powder or grains in liquid. Solid compositions in the form of a powder may be applied as foliar dusts.

Liquid compositions may comprise a solution or dispersion of an active ingredient in water optionally containing a surface-active agent, or may comprise a solution or dispersion of an active ingredient in a water-immiscible organic solvent which is dispersed as droplets in water. 14

Surface-active agents may be of the cationic, anionic, or non-ionic type or mixtures thereof. The cationic agents are, for example, quaternary ammonium compounds (e.g. cetyltrimethylammonium bromide). Suitable anionic agents are soaps; salts of aliphatic mono ester of sulphuric acid, for example sodium lauryl sulphate; and salts of sulphonated aromatic compounds, for example sodium dodecylbenzenesulphonate, sodium, calcium, and ammonium lignosulphonate, butylnaphthalene sulphonate, and a mixture of the sodium salts of diisopropyl and triisopropylnaphthalenesulphonic acid. Suitable non-ionic agents are the condensation products of ethylene oxide with fatty alcohols such as oleyl alcohol and cetyl alcohol, or with alkylphenols such as octyl- or nonyl- phenol (e.g. Agral 90) or octyl-cresol. Other non-ionic agents are the partial esters derived from long chain fatty acids and hexitol anhydrides, for example sorbitan monolaurate; the condensation products of the partial ester with ethylene oxide; the lecithins; and silicone surface active agents (water soluble surface active agents having a skeleton which comprises a siloxane chain). 22

The aqueous solutions or dispersions may be prepared by dissolving the active ingredient in water or an organic solvent optionally containing wetting or dispersing agent(s) and then, when organic solvents are used, adding the mixture so obtained to water optionally containing wetting or dispersing agent(s). Suitable organic solvents include, for example,

ethylene di-chloride, isopropyl alcohol, propylene glycol, diacetone alcohol, toluene, kerosene, methylnaphthalene, the xylenes and trichloroethylene.

The compositions for use in the form of aqueous solutions or dispersions are generally supplied in the form of a concentrate containing a high proportion of the active ingredient, and the concentrate is then diluted with water before use. The concentrates are usually required to withstand storage for prolonged periods and after such storage, to be capable of dilution with water to form aqueous preparations which remain homogeneous for a sufficient time to enable them to be applied by conventional spray equipment. Concentrates conveniently contain 20-90%, preferably 20-70%, by weight of the active ingredient(s). Dilute preparations ready for use may contain varying amounts of the active ingredient(s) depending upon the intended purpose; amounts of 0.01% to 10.0% and preferably 0.1% to 2%, by weight of active ingredient(s) are normally used.

A preferred form of concentrated composition comprising the active ingredient which has been finely divided and which has been dispersed in water in the presence of a surface-active agent and a suspending agent. Suitable suspending agents are hydrophilic colloids and include, for example, polyvinylpyrrolidone and sodium carboxymethylcellulose, and the vegetable gums, for example gum acacia and gum tragacanth. Preferred suspending agents are those which impart thixotropic properties to, and increase the viscosity of the concentrate. Examples of preferred suspending agents include hydrated colloidal mineral silicates, such as montmorillonite, beidellite, nontronite, hectorite, saponite, and saucorite. Bentonite is especially preferred. Other suspending agents include cellulose derivatives and polyvinyl alcohol.

The rate of application of the compositions of the invention will depend on a number of factors including, for example, the compounds chosen for use, the identity of the plants whose growth is to be inhibited, the formulations selected for use and whether the compound is to be applied for foliage or root uptake. As a general guide, however, an application rate of from 0.001 to 20 kilograms per hectare of total active ingredient is suitable while from 0.025 to 10 kilograms per hectare of total active ingredient may be preferred.

Preferably the compositions of the invention will contain 0.1-1% v/v of adjuvants in the spray solution.

EXAMPLE 1

The following test was carried out to determine the effect of Compound No. 12 in EP-A-355049 in combination with adjuvants for the control of a range of weed species. A 10% formulation of compound No. 12 was prepared with :-

	g/l
Calcium dodecyl benzene sulphonate	50
Synperonic NP13	50
Acteophenone	400
Solvesso 150	to 1 litre

The formulation alone and tank mixed in the appropriate proportions with adjuvants was then sprayed using the following methodology.

The treatments were prepared in 25ml volumetric flasks. The flasks were 2/3rd filled with deionised water and the required volume of formulated Compound No. 12 was pipetted into the flask. The adjuvants were then pipetted into the flasks to produce the required concentration as a percentage of the spray solution (25mls). The flasks were then made up to volume with deionised water, shaken and applied.

The treatments were applied in a track-spraying cabinet at a pressure of 30 p.s.i. using a single 8001E jet previously calibrated to deliver 200l/ha at the required spray height.

The % control at 14 days after application are given in Table I, and the full names of the tested plants are given in Table IX.

TABLE I

TREATMENT	RATE g/ha	PERCENT WEED CONTROL 14 DAYS AFTER TREATMENT							
		AG	AV	EI	LL	ST	CA	GA	00
Compound No 12	15.6	5.0	5.0	23.3	5.0	58.3	8.3	45.0	
	31.2	13.3	16.7	56.7	23.3	70.0	73.3	85.0	
	62.5	35.0	66.7	76.7	60.0	90.0	85.0	95.0	53.3
	125	61.7	88.3	95.0	97.7	96.3	86.7	99.0	68.3
	250	96.3	99.0	97.0	99.0	99.0	93.3	99.0	75.0
	500	94.7	99.0	99.0	99.0	99.3	95.0	99.0	90.0

TABLE I (continued)

TREATMENT	RATE g/ha	PERCENT WEED CONTROL							
		14 DAYS AFTER TREATMENT							
		AG	AV	EI	LL	ST	CA	GA	00
Compound No	15.6	43.3	45.0	89.0	36.7	83.3	76.7	96.0	
12	31.2	81.7	83.3	91.7	79.7	96.0	81.7	96.3	
+ 0.2%	62.5	83.0	94.7	99.0	97.7	96.3	90.0	99.0	50.0
Silwett L77	125	99.0	99.0	99.0	99.0	99.0	94.7	99.0	65.0
	250	99.0	99.0	99.0	97.7	99.3	95.0	99.0	73.3
	500	99.0	99.0	99.0	99.0	99.7	95.0	99.0	90.0
Compound No	15.6	55.0	38.3	89.7	55.0	91.7	68.3	99.0	
12	31.2	81.7	76.7	99.0	81.7	96.3	88.3	99.0	
+ 1%	62.5	97.7	97.7	97.7	99.0	99.0	93.3	99.0	65.0
Atplus 411F	125	99.0	99.0	99.0	99.0	99.3	96.3	99.0	65.0
	250	99.0	99.0	99.0	99.0	99.3	93.3	99.0	75.0
	500	99.0	99.3	99.0	99.0	99.3	95.0	99.0	90.0

Example 2

In this text compound 15 of EP-A-355049 was evaluated using a dispersion of the Compound in 2.5% by volume of the dispersant used in Example 1. The methodology used was as in Example 1, but with weed control being assessed 15 days after treatment.

The results are set out in Table II.

TABLE II

TREATMENT	RATE g/ha	PERCENT WEED CONTROL								
		14 DAYS AFTER TREATME								
		AG	AV	DG	EI	LL	ST	GA	PI	SM
Compound 15	15.6		1.0	30.0	5.0		17.5		60.0	42.5
	31.2	10.0	17.5	37.5	12.5	7.5	27.5	62.5	76.5	82.0
	62.5	27.5	60.0	55.0	27.5	5.0	45.0	81.5	100	100
	125	60.0	100	75.0	42.5	35.0	60.0	75.0	99.5	100
	250	70.0	100	75.0	67.5	35.0	75.0	99.5	100	100
	500	85.0				90.0		99.5		

TABLE II (continued)

TREATMENT	RATE g/ha	PERCENT WEED CONTROL 14 DAYS AFTER TREATME								
		AG	AV	DG	EI	LL	ST	GA	PI	SM
Compound 15	7.8		5.0	22.5	17.5		27.5		52.5	22.5
+0.2%	15.6	7.5	22.5	22.5	15.0	2.5	42.5	79.5	72.5	57.5
Agral 90	31.2	50.0	27.5	42.5	20.0	7.5	35.0	72.5	85.0	89.5
	62.5	50.0	82.5	60.0	25.0	17.5	57.5	77.5	90.0	90.0
	125	72.5	90.0	60.0	37.5	47.5	70.0	99.5	100	100
	250	97.0				74.5		99.5		
Compound 15	7.8		2.0		10.0		15.0		35.0	67.5
+0.2%	15.6	12.5	32.5	22.5	25.0	5.0	32.5	62.5	61.5	80.0
Silwet L77	31.25	10.0	37.5	25.0	15.0	10.0	37.5	80.0	79.0	99.5
	62.5	52.5	65.0	55.0	35.0	7.5	55.0	75.0	85.0	100
	125	92.0	92.0	65.0	62.5	57.5	67.5	99.5	99.0	100
	250	94.5				90.5		100		
Compound 15	7.8		18.5	22.5	17.5		30.0		70.0	50.0
+ 0.2%	15.625	12.5	22.5	22.5	15.0	10.0	32.5	67.5	70.0	60.0
HD373	31.25	37.5	99.0	62.5	30.0	10.0	45.0	80.0	76.5	99.5
	62.5	50.0	94.0	65.0	42.5	10.0	60.0	67.5	100	100
	125	87.5	94.0	70.0	65.0	65.0	75.0	74.0	100	99.5
	250	87.5				82.5		99.5		
Compound 15	7.8		89.5	35.0	17.5		22.5		60.0	45.0
+ 1%	15.6	17.5	27.5	35.0	40.0	2.5	42.5	72.5	80.0	55.0
Atplus 411F	31.2	60.0	55.0	55.0	25.0	10.0	50.0	82.5	82.5	87.0
	62.5	92.0	82.5	67.5	50.0	60.0	80.0	75.0	100	100
	125	92.5	100	70.0	65.0	60.0	77.5	100	86.5	100
	250	97.0				91.5		100		

EXAMPLE 3

Four further tests were carried out using the methodology of Example 1 using Compound No. 12 of EP-355049 in a 25% EC formulation as follows:-

	g/l
Compound No. 12	250
Calcium dodecyl benzene sulphonate	12.5
Synperonic NP13	12.5
Solvesso 150	to 1 litre

The results are set out in Tables III-VI.

TABLE III

PERCENT WEED CONTROL 19 DAYS AFTER TREATMENT

[illegible]

TABLE III (continued)

PERCENT WEED CONTROL 19 DAYS AFTER TREATMENT

[illegible]

TABLE III (continued)

PERCENT WEED CONTROL 19 DAYS AFTER TREATMENT

[illegible]

TABLE IV

PERCENT WEED CONTROL 19 DAYS AFTER TREATMENT

[illegible]

TABLE IV (continued)

PERCENT WEED CONTROL 19 DAYS AFTER TREATMENT

[illegible]

TABLE V

PERCENT WEED CONTROL 13 DAYS AFTER TREATMENT

		GA	SH	PI	CA	AG	AV	LL	EI	DG	ST
Compound 12	3.9	81.7	77.3	23.3		26.7					
+ 1.0%	7.8	91.0	91.3	45.0		43.3	21.7				
Atplus 411F	15.6	98.7	99.0	84.0	41.7	50.0	30.0	55.0	85.0	65.0	65.0
	31.2	98.7	99.0	84.0	61.7	76.7	79.3	85.0	98.3	70.0	82.0
	62.5				77.7		91.0	94.3	98.3	71.7	95.7
	125				79.3			98.3	99.0	93.3	99.0
Compound 12	3.9	71.7	81.3	50.0		33.3					
+ 0.25%	7.8	75.0	97.7	56.7		48.3	35.0				
Synprolam	15.6	90.7	99.3	58.3	70.0	56.7	51.7	45.0	74.3	51.7	45.0
35x10	31.2	98.0	99.3	89.0	63.3	68.3	75.0	53.3	80.7	53.3	51.7
	62.5				77.7		99.3	83.3	91.0	66.7	66.7
	125				80.7			86.0	97.7	75.0	86.0
Compound 12	3.9	56.7	97.3	33.3		28.3					
+ 0.25%	7.8	73.3	99.0	56.7		38.3	35.0				
Synperonic	15.6	98.3	99.0	70.0	53.3	51.7	35.0	48.3	58.3	50.0	36.7
A20	31.2	98.3	99.0	85.7	68.3	61.7	65.0	58.3	71.7	56.7	53.3
	62.5				72.3		89.7	65.0	89.0	70.0	68.3
	125				85.0			81.7	96.0	73.3	79.0
Compound 12	3.9	58.3	99.0	43.3		31.7					
+ 0.25%	7.8	91.3	99.0	71.7		40.0	36.7				
Silvet L77	15.6	98.0	99.0	87.7	51.7	48.3	66.7	61.7	69.0	55.0	43.3
	31.2	98.3	99.0	92.3	65.0	58.3	89.0	55.0	83.7	58.3	56.7
	62.5				81.7		92.7	85.0	97.3	63.3	58.3
	125				81.7			94.3	98.7	75.0	85.6

TABLE VI
PERCENT WEED CONTROL 14 DAYS AFTER TREATMENT

		GA	IH	PI	CA	AG	AV	LL	EI	DB	ST
Compound 12	3.9	61.7	92.5	41.7							
+ 1.0%	7.8	79.0	75.0	65.0	31.7	43.3	21.7				
Atplus	15.6	77.0	96.5	82.3	30.0	65.0	55.0	45.0			
411F	31.2	98.3	95.5	95.7	63.3	91.7	69.3	79.0	73.3	79.0	84.7
	62.5				73.3	96.7	100	91.0	87.3	94.3	88.7
	125							99.3	97.7	100	99.0
	250							97.0	97.7	99.0	
Compound 12	3.9	67.7	71.5	63.3							
+ 0.25%	7.8	84.0	77.5	58.3	36.7	45.0	33.3				
Synperonic	15.6	90.0	97.5	88.0	51.7	51.7	45.0	30.0			
A7	31.2	98.7	96.5	99.0	78.3	89.3	91.3	62.7	79.3	68.3	76.3
	62.5				73.3	97.3	98.0	93.7	82.3	76.7	84.0
	125							98.3	85.7	88.3	92.0
	250							98.3	98.3	98.3	
Compound 12	3.9	70.0	70.0	45.0							
+ 0.25%	7.8	80.7	86.5	71.7	63.3	33.3	45.0				
Synperonic	15.6	91.0	95.0	91.0	56.7	75.3	65.0	36.7			
91	31.2	83.3	97.5	86.7	60.0	81.3	81.3	43.3	74.0	79.7	59.0
	62.5				70.7	98.0	99.3	78.3	77.0	68.3	87.7
	125							99.0	91.0	89.3	94.3
	250							98.7	97.3	98.7	
Compound 12	3.9	64.3	72.5	53.3							
+ 0.25%	7.8	63.3	57.5	50.0	26.7	35.0	23.3				
Tween 20	15.6	76.0	67.5	71.0	31.7	26.7	51.7	25.0			
	31.2	88.7	95.0	82.7	58.3	60.0	53.3	28.3	43.3	75.0	55.0
	62.5				63.3	55.0	69.3	46.7	60.7	81.7	60.0
	125							82.3	68.3	81.3	84.7
	250							72.3	95.3	97.0	

TABLE VI (continued)

PERCENT WEED CONTROL 14 DAYS AFTER TREATMENT

		GA	IH	PI	CA	AG	AV	LL	EI	DB	ST
Compound 12	3.9	77.7	77.5	71.0							
+ 0.25%	7.8	81.3	87.5	70.0	31.7	26.7	35.0				
HD373	15.6	99.0	75.0	90.0	45.0	71.7	67.7	33.3			
	31.2	99.0	100	98.7	60.0	92.3	90.0	58.3	65.7	72.3	74.7
	62.5				53.3	92.7	99.0	56.7	88.0	87.0	84.0
	125							99.7	93.0	87.0	99.0
	250							98.0	98.3	98.7	
Compound 12	3.9	73.7	75.0	45.0							
+ 0.25%	7.8	89.3	91.0	77.0	35.0	40.0	25.0				
Abil	15.6	97.7	92.5	85.7	35.0	58.3	61.0	51.7			
ZP2434	31.2	98.7	95.0	94.7	61.7	85.7	85.0	68.0	76.3	80.3	65.0
	62.5				62.7	98.3	95.0	83.0	85.7	81.3	78.0
	125							99.7	81.3	90.0	95.0
	250							97.3	97.7	99.0	

EXAMPLE 4

Two further tests were carried out using the methodology of Example 1 using the methyl ester of Compound No. 15 of EP-355049 in a 7.5% EC formulation as follows:-

	g/l
Methyl ester of Compound No. 15	75
Calcium dodecyl benzene sulphonate	50
Synperonic NP13	50
Solvesso 150	to 1 litre

The results are set out in Table VII and VIII.

TABLE VII

PERCENT WEED CONTROL 17 DAYS AFTER TREATMENT

Methyl ester of COMPOUND 15 RATE +1.0% g/ha		CA	EH	TM	ECA	SH	ST	AG	EI	DG	LL	CN
ATPLUS 411F	1.5	20.0	50.0	26.0		5.0	46.0					
	3.1	33.7	70.0	62.3		16.7	63.7	21.7	26.7	33.3	10.0	
	6.2	53.7	71.7	70.0	35.0	77.0	79.3	23.3	52.0	35.3	11.7	
	12.5	67.0	87.7	76.7	40.0	47.0	84.7	38.7	70.3	56.7	16.7	
	25	91.3	95.0	100	73.3	100	98.0	69.0	81.7	73.7	37.0	11.7
	50	96.0	95.0	100	73.3	100	99.3	86.7	97.3	95.0	77.7	13.3
	100	96.3	96.0	100	99.3	100	100	98.3	96.3	100	92.7	32.7
	200				100			99.0	99.3	100	99.0	31.0
Methyl ester of COMPOUND 15 +1.0%												
AL2042	1.5	61.3	68.3	26.7		8.3	35.0					
	3.1	46.7	51.7	60.7		13.3	51.7	20.0	21.0	30.0	16.7	
	6.2	58.7	89.3	69.0	26.7	29.3	61.7	27.0	30.0	32.7	18.3	
	12.5	80.3	95.0	86.7	25.0	70.3	76.7	31.7	41.0	38.7	21.0	
	25	86.7	95.0	100	47.7	91.7	91.0	50.0	46.7	62.0	27.7	6.7
	50	96.3	96.0	100	66.7	100	98.0	66.0	66.0	72.0	53.3	8.3
	100	98.7	95.0	100	80.0	100	99.7	93.0	82.0	100	57.0	21.7
	200				90.0			95.3	93.3	100	73.7	40.0
Methyl ester of COMPOUND 15 + 1.0%												
AZONE	1.5	24.3	51.7	31.7		8.3	50.0					
	3.1	43.7	58.3	57.0		20.0	49.3	24.3	40.0	26.0	11.7	
	6.2	60.0	66.7	63.7	19.3	40.3	50.0	21.7	37.7	38.3	21.7	
	12.5	67.0	83.3	83.3	26.7	42.0	53.7	46.7	46.7	48.3	20.0	
	25	80.0	93.3	100	51.7	67.3	75.3	50.0	69.0	62.3	30.3	13.3
	50	90.0	88.3	100	55.0	78.3	89.7	70.7	71.7	60.0	50.0	21.7
	100	95.0	95.0	100	81.7	95.0	92.3	91.0	98.7	69.0	93.0	36.0
	200				98.3			99.0	99.0	86.7	99.0	51.7

TABLE VII (continued)

PERCENT WEED CONTROL 17 DAYS AFTER TREATMENT

Methyl ester of		CA	EH	TH	ECA	SH	ST	AG	EI	DG	LL	CN
COMPOUND 15	RATE											
+1.0% g/ha												
Methyl ester of												
COMPOUND 15	1.5	31.7	61.7	36.0		10.0	32.7					
+ 1.0%	3.1	51.0	61.7	69.0		22.7	53.3	15.0	31.0	27.7	11.7	
ORCHEX 796	6.2	57.3	78.3	83.7	26.7	43.3	81.7	25.0	63.7	38.7	15.0	
+ ATPLUS	12.5	82.0	91.7	81.7	41.7	91.7	86.7	49.7	70.3	46.0	24.3	
300F	25	88.3	95.0	98.3	86.7	100	99.3	77.0	88.3	73.7	35.0	20.0
	50	97.7	95.0	100	88.3	100	99.7	94.3	98.0	91.7	62.0	28.3
	100	96.0	95.0	100	100	100	100	99.0	97.7	100	87.0	33.3
	200				99.7			99.0	99.0	100	98.0	32.7
Methyl ester of												
COMPOUND 15	1.5	27.7	76.7	52.0		27.7	50.0					
+ 1.0% DASH	3.1	50.3	83.3	70.7		36.7	48.3	24.3	38.3	33.7	10.0	
	6.2	46.7	92.7	81.7	30.0	63.3	76.7	38.7	60.7	50.0	20.0	
	12.5	83.7	95.0	95.0	53.3	91.7	90.7	45.0	70.5	58.7	21.7	
	25	88.3	94.3	100	89.7	100	99.3	78.3	68.7	72.3	50.0	15.0
	50	88.3	95.0	100	84.7	100	99.7	88.0	96.7	88.3	58.7	15.0
	100	97.3	96.0	100	99.7	100	100	99.0	98.7	100	89.3	26.0
	200				99.3			99.0	98.0	100	99.0	43.3
Methyl ester of												
COMPOUND 15	1.5	36.0	89.3	100		38.3	56.7					
+ 1.0% DASH	3.1	27.7	80.0	69.0		51.3	57.0	16.7	36.0	30.3	18.3	
+ 4.0% urea	6.2	51.7	90.7	75.3	43.3	88.7	68.7	36.0	62.0	45.0	23.3	
ammonium	12.5	86.7	91.7	93.3	49.7	80.3	81.7	51.3	70.3	63.7	26.0	
nitrate	25	89.3	95.0	98.3	81.7	99.7	94.7	75.7	84.7	83.3	50.0	11.7
	50	96.3	96.0	100	95.0	99.7	99.3	89.7	96.3	100	68.3	15.0
	100	99.0	96.0	100	99.7	99.7	99.7	98.7	98.0	100	99.0	30.0
	200				100			99.0	98.3	100	99.0	38.3

TABLE VIII

PERCENT WEED CONTROL 17 DAYS AFTER TREATMENT

Methyl ester of		TM	EH	ST	SH	CA	EI	LL	AG	DG	ECA	CN
COMPOUND 15	RATE											
+1.0%	g/ha											
ATPLUS	1.5	33.3	44.3	51.7	15.7		46.7			35.0		
411F	3.1	54.3	54.3	67.3	52.3	75.0	70.3	35.0		47.0		
	6.2	73.3	85.0	86.3	69.3	82.0	79.3	39.3		66.0	63.3	
	12.5	94.3	93.3	96.7	78.3	93.3	97.7	53.0	33.3	78.3	82.3	
	25	100	95.7	100	93.3	96.3	99.0	77.7	56.7	83.3	89.0	52.0
	50	100	95.7	100	99.3	99.0		97.3	82.7	100	100	45.0
	100	100	96.3	100	99.7			99.0		100	100	45.0
	200							98.7			100	62.0
Methyl ester of												
COMPOUND 15	1.5	47.3	47.0	40.3	21.7		48.7			40.0		
+ 0.25%	3.1	77.7	60.0	63.3	29.3	75.0	52.7	25.0		53.3		
SILWET L77	6.2	90.7	71.7	73.3	50.3	86.7	80.0	31.0		70.0	73.3	
	12.5	98.3	85.0	80.0	74.0	92.7	99.0	43.3	27.3	85.3	74.0	
	25	100	93.7	97.3	90.7	98.7	99.7	68.0	57.7	99.7	82.7	69.0
Methyl ester of												
COMPOUND 15	1.5	41.7	40.0	36.0	20.7		36.0			31.7		
+ 0.25%	3.1	60.7	60.0	52.0	37.7	75.0	54.7	14.7		50.0		
X2 5309	6.2	80.3	70.0	67.3	62.3	91.7	80.0	34.3		62.3	61.7	
	12.5	100	83.3	80.7	73.7	97.3	83.7	53.0	15.7	76.7	71.7	
	25	100	92.3	94.3	93.3	97.7	99.3	53.7	23.3	90.7	78.0	66.0
Methyl ester of												
COMPOUND 15	1.5	32.3	73.3	42.7	29.0		40.0			48.3		
+ 0.25%	3.1	75.0	75.3	49.7	27.0	76.7	71.7	30.0		48.3		
HD373	6.2	82.0	81.7	75.0	65.3	85.3	85.7	27.3		77.3	57.7	
	12.5	98.7	91.7	94.0	94.7	98.0	97.7	37.7	31.0	75.3	65.3	
	25	100	94.0	99.7	87.7	98.7	66.7	38.3	89.7	79.7	70.7	

TABLE VIII (Continued)
PERCENT WEED CONTROL 17 DAYS AFTER TREATMENT

	RATE	TM	EH	ST	SH	CAL	EI	LL	AG	DG	ECA	CN
Methyl ester of												
COMPOUND 15	1.5	44.3	71.7	56.7	24.0		51.7			46.0		
+ 0.25%	3.1	61.0	78.3	60.3	51.7	81.7	64.0	14.7		62.3		
SYNPERONIC	6.2	75.7	85.0	73.7	58.3	88.7	76.7	40.7		70.3	65.3	
A7	12.5	98.7	92.3	91.0	90.0	97.7	94.3	42.0	20.7	86.7	70.3	
	25	100	94.0	97.7	99.7	98.7	99.0	61.0	52.3	90.7	75.0	58.7

Methyl ester of												
COMPOUND 15	1.5	25.0	63.3	52.0	26.7		58.7			41.7		
+ 0.25%	3.1	57.0	67.3	60.0	46.7	78.7	62.0	7.3		60.3		
Synperonic	6.2	87.0	75.0	80.0	41.0	76.7	69.7	32.7		65.0	65.0	
A20	12.5	95.0	89.0	87.7	77.0	85.7	90.7	40.7	18.0	82.7	67.0	
	25	100	89.0	98.3	84.3	96.0	96.7	64.7	33.3	85.0	70.0	53.7

TABLE IX

Abbreviations used for Test Plants

Ih	-	<u>Ipomoea hederacea</u>
Pi	-	<u>Polygonum aviculare</u>
Ca	-	<u>Chenopodium album</u>
Ga	-	<u>Galium aparine</u>
Eh	-	<u>Euphorbia heterophylla</u>
Av	-	<u>Avena fatua</u>
Dg	-	<u>Digitaria sanguinalis</u>
St	-	<u>Setaria viridis</u>
Sh	-	<u>Sorghum halepense</u>
Ag	-	<u>Agropyron repens</u>
Cn	-	<u>Cyperus rotundus</u>
Ei	-	<u>Eleusine indica</u>
Ll	-	<u>Lolium penenne</u>
Oo	-	<u>Ottochloa nodosa</u>
Sm	-	<u>Stellaria media</u>
Tm	-	<u>Matricaria perforata</u>
Eca	-	<u>Conyza canadensis</u>

CLAIMS

1. A herbicidal composition comprising a compound as defined in EP-A-355049 or EP-A-367242 in combination with an adjuvant selected from silicon polymers, oil based spray adjuvants, alcohol ethoxylates, nonyl phenol ethoxylates, amine ethoxylates, blended surfactants and alkoxylated amines.
2. A herbicidal composition according to claim 1 in which the adjuvant is selected from Silwet L77 , Q2 5152, X2 5309, Abil ZP2434, Atplus 411F, Atplus 412, Complus 328, Spraymate, Orchex 796, Atlox 4848, Synperonic A7, Synperonic 91/6, Synperonic A20, Agral 90, Synprolam 35x10, Ethoquad C15, Atplus 300F, Acer 89001 and Acer 89002.
3. A herbicidal composition according to claim 2 in which the adjuvant is Silwet L77.
4. A herbicidal composition according to claim 2 in which the adjuvant is Q2 5152.
5. A herbicidal composition according to claim 2 in which the adjuvant is X2 5309.
6. A herbicidal composition according to claim 2 in which the adjuvant is Abil ZP2434.
7. A herbicidal composition according to claim 2 in which the adjuvant is Atplus 411F.
8. A herbicidal composition according to claim 2 in which the adjuvant is Atplus 412.
9. A herbicidal composition according to claim 2 in which the adjuvant is Complus 328.
10. A herbicidal composition according to claim 2 in which the adjuvant is Spraymate.

11. A herbicidal composition according to claim 2 in which the adjuvant is Orchex 796.
12. A herbicidal composition according to claim 2 in which the adjuvant is Atlox 4848.
13. A herbicidal composition according to claim 2 in which the adjuvant is Synperonic A7.
14. A herbicidal composition according to claim 2 in which the adjuvant is Synperonic 91/6.
15. A herbicidal composition according to claim 2 in which the adjuvant is Synperonic A20.
16. A herbicidal composition according to claim 2 in which the adjuvant is Agral 90.
17. A herbicidal composition according to claim 2 in which the adjuvant is Synprolam 35x10.
18. A herbicidal composition according to claim 2 in which the adjuvant is Ethoquad C15.
19. A herbicidal composition according to claim 2 in which the adjuvant is Atplus 300F.
20. A herbicidal composition according to claim 2 in which the adjuvant is Acer 89001.
21. A herbicidal composition according to claim 2 in which the adjuvant is Acer 89002.
22. A herbicidal composition comprising a compound as defined in EP-A-355049 or EP-A-367242 in combination with an adjuvant selected from alkyl glucosides, sulphated oils, urea ammonium nitrate, Azone and DASH.

23. A herbicidal composition according to claim 22 in which the adjuvant is an alkyl glucoside.
24. A herbicidal composition according to claim 22 in which the adjuvant is a sulphated oil.
25. A herbicidal composition according to claim 23 in which the adjuvant is an Calsolene oil HS.
26. A herbicidal composition according to claim 22 in which the adjuvant is urea ammonium nitrate.
27. A herbicidal composition according to claim 22 in which the adjuvant is Azone.
28. A herbicidal composition according to claim 22 in which the adjuvant is DASH.
29. A method of killing or controlling unwanted plant species which method comprises applying to the plants or to the locus thereof a herbicidally effective amount of a composition according to any of claims 1 to 28.

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Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

Application number

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Relevant Technical fields

(i) UK Cl (Edition K) A5E ED EF

(ii) Int Cl (Edition 5) A01N

Databases (see over)

(i) UK Patent Office

(ii)

Search Examiner

P N DAVEY

Date of Search

7 AUGUST 1991

Documents considered relevant following a search in respect of claims

1-29

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
P,X	EP 0444769 A1 (ICI) 4 September 1992, see eg. page 2, line 3, page 7, lines 34-40 and example 2	1-3,7,16 29
Y	EP 0367242 A2 (AMERICAN CYANAMID) See whole document	1
Y	EP 0355049 A2 (ICI) See whole document	1
Y	EP 0257686 A1 (AKZO) See eg page 2, lines 34-42	1

Category	Identity of document and relevant passages	Relevant to claim(s)

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